



# ICAO ENGINE nvPM EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: CF34-10E2A1 BYPASS RATIO (-): 5.1  
 UNIQUE ID NUMBER: 01P08GE203 PRESSURE RATIO  $\pi_{co}$  (-): 25.0  
 COMBUSTOR: SAC  
 ENGINE TYPE: TF RATED OUTPUT  $F_{co}$  (kN): 75.4

### REGULATORY DATA

CHARACTERISTIC VALUES:	$LTO_{mass}/F_{co}$ (mg/kN)	$LTO_{num}/F_{co}$ (particles/kN)	NVPM MASS CONCENTRATION ( $\mu\text{g}/\text{m}^3$ )
LTO/ $F_{co}$ AND MAX nvPM <sub>mass</sub>	113.2	2.58E+15	1811
AS % OF CAEP/10 LIMIT	-	-	23.5
AS % OF CAEP/11 LIMIT (InP)	3.7	14.2	
AS % OF CAEP/11 LIMIT (NT)	15.5	29.3	

### MEASURED DATA

MODE	POWER SETTING (% $F_{co}$ )	TIME minutes	FUEL FLOW kg/s	EMISSIONS INDICES*		NVPM MASS CONCENTRATION PEAK nvPM <sub>mass</sub> ( $\mu\text{g}/\text{m}^3$ )
				EI <sub>mass</sub> (mg/kg)	EI <sub>num</sub> (particles/kg)	
TAKE-OFF	100	0.7	0.770	52.0	4.50E+14	
CLIMB OUT	85	2.2	0.635	31.3	3.93E+14	
APPROACH	30	4.0	0.218	1.6	9.30E+13	
IDLE	7	26.0	0.083	13.4	6.73E+14	
LTO TOTAL (kg, mg, number of particles)			299	6141	1.40E+17	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				3	3	3
AVERAGE LTO/ $F_{co}$ VALUES (mg/kN, particles/kN)				81.4	1.86E+15	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ( $\mu\text{g}/\text{m}^3$ )				52.0	6.73E+14	1407

\* Emissions Indices are corrected for thermophoretic loss and fuel hydrogen content

### DATA FOR EMISSIONS INVENTORIES (ESTIMATIONS FOR ENGINE EXIT PLANE VALUES)

MODE	POWER SETTING (% $F_{co}$ )	CORRECTED EMISSIONS INDICES	
		EI <sub>mass_SL</sub> (mg/kg)	EI <sub>num_SL</sub> (particles/kg)
TAKE-OFF	100	62.5	1.33E+15
CLIMB OUT	85	39.0	1.37E+15
APPROACH	30	3.0	9.10E+14
IDLE	7	23.1	5.92E+15

### AMBIENT CONDITIONS

	From	To	FUEL	
BAROMETER (kPa)	98.1	98.6	HEAT OF COMBUSTION (MJ/kg)	43.08
TEMPERATURE (K)	293.2	298.4	HYDROGEN CONTENT (%mass)	13.74
HUMIDITY (kg water/kg dry air)	0.0084	0.0111	AROMATICS CONTENT (%vol)	19.1
			NAPHTHALENE CONTENT(%vol)	0.22
			SULPHUR CONTENT (ppm by mass)	0

MANUFACTURER: General Electric Company  
 TEST ORGANIZATION: General Electric Company  
 TEST LOCATION: PTO, Site 3C  
 TEST DATES: 24/07/2019-25/07/2019

### REMARKS

- GE Aviation Report R2019AE310/Rev. 0
- Engine S/N 424-879/1